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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,847	10/04/2001	Michael Pearson	33981US1	1640
116	7590	11/17/2004	EXAMINER	
PEARNE & GORDON LLP 1801 EAST 9TH STREET SUITE 1200 CLEVELAND, OH 44114-3108			JERABEK, KELLY L	
			ART UNIT	PAPER NUMBER
			2612	

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/970,847	Applicant(s) PEARSON, MICHAEL	
	Examiner Kelly L. Jerabek	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-17 is/are rejected.
- 7) ☒ Claim(s) 5-6 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/10/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the timings (t_{RESET} , t_{READ} , t_{ROW} , t_{HB}) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 7-17 rejected under 35 U.S.C. 103(a) as being anticipated by the Applicant's admitted prior art in view of Guidash US 6,218,656.

Re claim 1, the applicant's conceded prior art discloses a method of controlling light sensitive elements arranged in rows and columns in an image sensor comprising the steps of: initially resetting a light sensitive element during a reset time (t_{RESET}), reading the light sensitive element after an integration time (t_{INT}), during a read time (t_{READ}) and resetting the light sensitive element a second time during a portion of the read time (t_{READ}) (fig. 5; specification: page 4, lines 1-21). However, the applicant's admitted prior art states that the read circuitry associated with the array (609) cannot necessarily perform a double sampling reset. For example, the second reset (502,504,506) on an earlier row may not be possible because a later row may be using that address to perform a pre-integration reset (503,505,507) (specification: page 5, lines 15-21).

Guidash discloses in figure 3 a timing diagram of the operation of 3-transistor pixels of a CMOS active pixel sensor device capable of performing correlated double sampling. The pixel operation described takes place for an entire row of pixels (10) in a rolling shutter operation of CMOS active pixel sensor devices (col. 3, lines 30-37). According to the timing diagram shown in figure 3, each row (i-2, i-1, i, i+1) has an initial reset period (select row), an integration period, a readout period, and a second reset period (deselect row) (col. 3, line 45 – col. 4, line 39). It can be seen in figure 3 that there is a delay (t_{ROW}) between the selection (reset) of one row and the deselection (second reset) of the previous row (example: delay between deselection of row (i-1) and selection of row (i)). Thus, Guidash discloses sequentially resetting each successive row of light sensitive elements after a time period (delay between deselection of row (i-1) and selection of row (i)). Therefore, it would have been obvious for one skilled in the art to have been motivated to include the timing of the 3-transistor photodiode pixel for providing a CDS output signal as disclosed by Guidash in the rolling shutter technique disclosed by applicant's admitted prior art figure 5. Doing so would provide a means for deselecting a row following the readout of that row and selecting a subsequent row following the deselection of the previous row (Guidash: col. 3, line 65 – col. 4, line 12).

Re claims 2 and 3, the applicant's conceded prior art includes a 3-transistor CMOS sensor array (609) (fig. 6; specification: page 4, lines 25-27).

Re claim 4, Guidash discloses in figure 3 a timing diagram of the operation of 3-transistor pixels of a CMOS active pixel sensor device capable of performing correlated double sampling. The pixel operation described takes place for an entire row of pixels (10) in a rolling shutter operation of CMOS active pixel sensor devices (col. 3, lines 30-37). According to the timing diagram shown in figure 3, each row (i-2, i-1, i, i+1) has an initial reset period (select row), an integration period, a readout period, and a second reset period (deselect row) (col. 3, line 45 – col. 4, line 39). It can be seen in figure 3 that there is a delay (t_{ROW}) between the selection (reset) of one row and the deselection (second reset) of the previous row (example: delay between deselection of row (i-1) and selection of row (i)). Therefore, the light sensitive element in each row are reset simultaneously and each row of light sensitive elements are sequentially reset after after a time period.

Re claim 7, the double sampling technique disclosed by the applicant's admitted prior art shows that the second resetting time of each row occurs towards the end of the read time (t_{READ}) (figs. 4,5).

Re claims 8, 9, and 12, see claim 1.

Re claims 10 and 13, see claim 2.

Re claims 11 and 14, see claim 3.

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Re claims 15 and 17, the frame read sequence disclosed by figure 5 of the applicant's admitted prior art is achieved by addressing row reset and read lines independently with the use of two separate counters (610,611). Reset decoder (605), reset driver (612), row decoder (606), and row driver (613) all operate in order to generate the frame read sequence according to figure 5 (specification: page 4, line 23 – page 5, line 10). However, the applicant's admitted prior art fails to distinctly state that the reset decoder (605), reset driver (612), and row driver (613) include NAND gates and amplifiers and row decoder (606) includes and AND gate. However, the Examiner takes **Official Notice** that it is well known in the art to use NAND gates, AND gates, and amplifiers to generate reset and row access signals during readout. Therefore, it would have been obvious for one skilled in the art to have motivated to include NAND gates, AND gates, and amplifiers in the row and reset decoders and row and reset drivers disclosed by the applicant's admitted prior art.

Re claim 16, the applicant's conceded prior art includes reset drivers (612) coupled to a reset control circuit (605) and row access drivers (613) coupled to a row access decode circuit (606) (fig. 6; specification: page 4, line 23 – page 5, line 2).

Allowable Subject Matter

Claims 5 and 6 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fail to anticipate or render obvious the following technical features as recited in the highlighted claims:

Referring to claims 5 and 6, the prior art fails to teach or suggest that the time period (t_{ROW}) is greater than or equal to either (t_{READ}) or ($t_{\text{READ}} + t_{\text{HB}}$).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Merrill et al. US 6,410,899 discloses an active pixel sensor with bootstrap amplification and reduced leakage during readout. The information disclosed in this document regarding readout including AND and NAND gates is pertinent material.

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Guidash US 6,624,850 discloses a photogate active pixel sensor with high fill factor and correlated double sampling. The information regarding double sampling is pertinent material.


Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly L. Jerabek whose telephone number is 703-305-8659. The examiner can normally be reached on Monday - Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for submitting all Official communications is 703-872-9306. The fax phone number for submitting informal communications such as drafts, proposed amendments, etc., may be faxed directly to the Examiner at 703-746-3059.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KLJ


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